

temperature at depths bearing considerable ratios to the radius. Indeed the state of our knowledge is best expressed by the words of the old song, "Oh dear! what can the matter be?" It is even conceivable that, whatever it be, it may be above its own critical temperature; in which case the laws affecting incompressible liquids become inapplicable.

An interesting paper upon this latter hypothesis was published by Prof. Zöppritz in the *Transactions* of the first Geographical Congress of Berlin, 1881. It is entitled "Ueber die Mittel und Wege zu besserer Kenntniss vom inneren Zustand der Erde zu gelangen," and published by D. Reimer, Berlin.

Harlton, Cambridge, August 24

O. FISHER

I OBTAIN NATURE in monthly parts, and am indebted to a friend for calling attention to the article on "Elevation and Subsidence" by Mr. J. Starkie Gardner in vol. xviii. p. 323, in which he considers that, "wherever considerable weight is added to any part of the earth's surface, a corresponding subsidence of its crust almost invariably follows." As it is evident from the last paragraph in Mr. Gardner's paper that he esteems this opinion to be novel to the readers of NATURE, and being the first time it can be considered as having been discussed in your pages, it might have been more satisfactory perhaps had he passed in review the conclusions arrived at by others who have preceded him.

Sir John Herschel (see "Physical Geography," § 132, 1862, and "Familiar Lectures," Lecture I.), assumed in a general manner that "if continents are lightened they will rise; if the bed of the sea receives additional weight it will sink." It is to be regretted that the facts advanced as evidence by so great an authority did not prove sufficiently conclusive to claim general acceptance. Mr. T. F. Jamieson, F.G.S., in 1865 (*Quarterly Journal of the Geological Society*, vol. xxi. page 178), considered that the enormous weight of snow accumulated during the glacial period "may have had something to do with the depression of the land which then occurred, and that the melting of the ice at its termination would account for the rising of the land."

Under the advocacy of Prof. James Hall ("Palæontology of New York," vol. iii., 1859), the subject has received much consideration in America; this has been so great that Capt. C. E. Dutton, of the United States Geological Survey, was enabled to say that "few geologists now question that great masses of sedimentary matter displace the earth beneath them and subside" (NATURE, vol. xix. p. 251).

The principle that accumulation of material causes subsidence and that denudation results in elevation of the crust of the earth has been advocated by myself on numerous occasions during the last eighteen years, being considered equally applicable to rocks of every age during the whole series; in England from the Cambrian rocks of Shropshire to those now in process of deposition in the seas which surround our coasts. The idea originated to me from observations in the Longmynd and of the Upper Silurians of Shropshire and North Wales during 1864. Its universal application and the physical effects dependent on the phenomena formed the special subjects of two addresses as president of the Liverpool Geological Society in 1871 and 1872. The conclusions were deemed by NATURE (vol. vi. p. 379) of such importance that you considered my "interpretation of the facts deserved further consideration." Abstracts of these essays also appeared in the *Geological Magazine*, vol. ix. p. 119, and vol. x. p. 202. The views entertained have been subsequently advocated by me in the *Proceedings of the Liverpool Geological Society*, the *Geological Magazine*, and the *Reports of the British Association*, the last time being during the meeting of the British Association at Southampton (Report, 1882, p. 540), which paper has appeared in full in the *Geological Magazine* for July and August, 1883.

The only author who has considered this subject and to whom Mr. Gardner refers, is the Rev. O. Fisher, F.G.S., whom he deservedly praises for his masterly work, "The Physics of the Earth's Crust," 1881.

In spite of much adverse criticism I have been content to wait all these years, feeling convinced that after commendation similar to that accorded by you (by no means a singular occurrence), the subject of oscillation, as the result of changes in the distribution of sediments, would eventually be taken into consideration; for a frequent remark has been that "there appears to be something in it"; and no geological fact is more persistently referred to than that the formation of sedimentary strata of every age "has occurred during a period of subsidence."

Birkenhead, August 22

CHARLES RICKETTS

"Decentralisation in Science"

I FULLY agree with the remarks on this important subject made in your leading article of last week; and the necessity for local scientific societies being in some way placed in direct communication with each other and with the central metropolitan societies has long been present in my mind. It is perhaps as yet premature to broach any definite scheme for effecting this object, which, as the writer of the article points out, would be surrounded by very great practical difficulties. The whole subject might very well be discussed by the Conference of Delegates about to attend the meeting of the British Association at Southport.

There are numerous scientific societies and field-clubs throughout the country whose work is being frittered away in useless directions solely from the want of proper scientific guidance. As a preliminary step towards this most desirable economising of individual energy it appears to me that centralisation in the various counties is the first essential. This has been well enforced in the Preliminary Report of the "Local Scientific Societies" Committee of the British Association, published in NATURE a short time ago by Mr. Francis Galton, the Chairman of the Committee.

It is most satisfactory to know that the British Association has taken the matter in hand, as this body is of all others the most competent to deal with the subject, if for no other reason because the Association is the only scientific society that holds its meetings in various provincial centres. Among the difficulties that would have to be met in any scheme of county affiliation not the least formidable is the purely local feeling existing in many small societies, which leads their officers and members to reject all overtures from larger and more influential bodies in the mistaken belief that cooperation would entail a loss of individuality. A good illustration of this kind of difficulty has quite recently come under my notice in attempting to bring about some kind of amalgamation between the local societies of the county of Essex.

Till such narrow views of the functions of a local society are successfully combated no great advance towards centralisation can be made.

R. MELDOLA

21, John Street, Bedford Row, W.C., August 27

The Earthquake in Ischia

IN 1878, when touring in the Himalayas, we spent the last two Sundays in August at Kyelang, in the Lahoul Valley. On each of these days I felt a sharp shock of earthquake about 4 p.m.

On both occasions I was sitting in a room on the upper floor of the German missionaries' house. A broad wooden verandah runs round the front and sides of the lower floor of this building.

I was about to rise and leave the room, when I heard a loud rumbling noise; my first idea was that the children of the house were amusing themselves with dragging each other in a small wooden waggon up and down this verandah as they were in the habit of doing, but the sound was much louder, as loud as that of a railway train when near the spectator. A second later I felt a violent oscillation, and a padlocked door, opposite the door of exit, shook violently backwards and forwards several times. A week later another earthquake occurred almost at the same hour, and under the same conditions.

Three years later, in 1881, we again passed through the same part of the Himalayas on our return from the Spiti Valley, which we had reached by way of Kunowar.

This time no earthquake took place during our stay in Lahoul; we crossed the Rotang Pass, and went to stay in the Kulu Valley with our friend Col. S—, Deputy Conservator of Forests at Mañali, about sixteen miles on the southern side of that mountain. Col. S—'s house is raised high above the river on the right bank of the Beas; it is placed in the midst of a Deodar forest, and built of wooden logs placed horizontally, and alternating with courses of large stones laid one upon the other, but not mortared together. A wooden verandah runs all round the building, and forms a balcony to the rooms on the upper floor. I imagine it is its mode of construction which enabled this house to resist the severe test to which it was subjected on this occasion.

On October 1, about 1 p.m., we were sitting, a party of three persons, in a temporary verandah resting on the bare earth, and floored with matting, which our host had erected to supplement the permanent one where our native tailor was seated at work.

I had just risen to speak to him, but before I could do so, a loud rumbling sound seemed to come on my right hand (or from the direction of the Kulu Valley).

One of the party called out *thun*—we had had a thunderstorm the day before—but changed the word to *earthquake*. For a second or two I held my breath—I felt rooted to the spot; then the permanent wooden balcony over my head began to creak and groan most violently, and I distinctly saw the front wall of the house advance towards me, and recede from me, three or four times.

After the motion had ceased, the rumbling sound, which at its greatest intensity seemed beneath our feet, died away in the opposite direction (or towards Simla). I made many inquiries afterwards, but was unable to ascertain whether any shocks of earthquake had been experienced on these dates either in Kulu in 1878 or in Lahoul or at Simla in 1881.

The recent catastrophe in the Island of Ischia has called the attention of those who make a study of such disturbances of the earth's surface to the simultaneous occurrence of earthquakes in various parts of the world, which induces me to send you these facts, in the hope that they may interest some of your readers and lead them to form some conjecture as to the possible centre of the earthquakes in the Himalayas.

I am not aware to what extent the geological formation of the Himalayas has been investigated, but (speaking as a non-professional) during three long tours in various parts of these mountains I have never observed any traces of extinct volcanoes. I ought, however, to mention, perhaps, that there are hot springs at Jeshist on the left bank of the Beas River, about four miles from Mañali, and also at Manikern, in the Parbuti valley, which debouches from the Kulu valley, about thirty miles lower down, also on the left bank of the river. Manikern is a great place of resort for Hindu pilgrims, who consider these hot springs miraculous; it is also occasionally visited by Europeans who have found these waters efficacious in rheumatic affections. Earthquakes do not seem to be uncommon in these valleys, but it has been remarked that they generally, if not always, occur in the autumn, just when the rainy season is at an end.

COSMOPOLITAN

Lime and Bones

THE observation of your correspondent in *NATURE*, vol. xxviii. p. 329, regarding the effect of lime in strengthening the bones of children, induces me to communicate certain facts which I observed during a recent tour of two months in Norway.

We travelled by land from Christiania to Throndhjem, thence by sea to the North Cape and back, and made expeditions into the interior at different points on our downward journey.

I noticed everywhere an extraordinary number of weak-boned, crippled, and bandy legged children, also a great number of men and women with weak bones and distorted limbs.

Almost the whole of Norway is a network of mountains composed of various forms of primitive and metamorphic rock, and though marble exists in this country I saw none in the districts through which we passed.

COSMOPOLITAN

Christiania, August 11

Copper and Cholera

REFERRING to the paper read before the French Academy (as reported in your last issue) on copper as a preservative against cholera, it may be worth while to state that when visiting the great copper mines at Falun in Sweden (probably the oldest and largest in the world) I was informed that cholera had never appeared there, and that so well was the fact known that on the last visitation of cholera in Sweden some members of the Royal family took up their abode in Falun to escape the disease. The atmosphere was there loaded with copper fumes to such an extent that not a trace of vegetation was visible on the hills surrounding the town; so that this really seems to confirm by experience on a large scale the theory alluded to.

WALTER R. BROWNE

Sulphur in Bitumen

FROM the abstract of the meeting of the Paris Academy of Sciences in your last number (vol. xxviii. p. 408), M. B. Delachanal appears to consider that the presence of sulphur is

peculiar to the bitumen of the Dead Sea, and from this he deduces a theory as to its inorganic origin.

In some experiments which I had occasion to make this summer on the bitumen of the Great Pitch Lake of Trinidad I found that this substance contained a very considerable quantity of sulphur. Several per cents. of the volume of the gas obtained by its destructive distillation consisted of hydrogen sulphide. The origin of this asphalt is generally considered to be organic, but I am not aware whether the entire absence of calcium salts from its ash, a fact which was proved nearly a century ago, and has since been confirmed, has been explained on this theory.

HUGH ROBERT MILL

Edinburgh, August 27

Thunderstorms and Auroræ

A CONNECTION between these phenomena has been repeatedly suggested. J. W. Ritter has articles on the subject in Gilbert's *Annalen* (1803 and 1804), and Kupffer has a long one in 1827. Other writers who have dealt with it or with the connection between auroræ and atmospheric electricity generally are Schüble (1817), R. Phillips (1854), F. Dellmann (1860), E. Loomis (1860, 1861, and 1862), A. Poeey (1861), A. De la Rive, F. Abbott (1863), E. Edlund; and in *NATURE*, vol. xii. p. 127, there is a summary of the observations by Herr von Bezold. This may serve as a partial answer at the end of Mr. Chadbourne's letter.

A. RAMSAY

4, Cowper Road, Acton, W., August 27

The Meteor of August 19

THE details of this meteor in the letter of your correspondent Mr. Mott and my own are for the most part in such close accordance that one might suppose we had been comparing notes. There is, however, one particular in which our respective accounts differ so widely that one feels inclined to ask whether there were two meteors or whether one of your correspondents has made a mistake as to the direction of the course of the meteor.

First let me correct an error of my own. I find now I was wrong in giving the point of starting as a *few degrees* eastward of the north star. I am somewhat of a stranger at the place where I saw it, and I now find that the point from which it started was as nearly as possible north-east, and about 65° or 70° above the horizon.

I am quite clear as to the path being downwards in an almost perpendicular direction inclining a little to the left. Mr. Mott, on the other hand, describes it as "nearly horizontal, inclined a little downwards about 10° or 12° above the horizon, apparently much foreshortened." It appears to me—perhaps owing to a want of scientific knowledge—quite impossible that a meteor visible a few miles south-west of London, falling as I have described, could be identical with one seen two hundred miles north-west of London travelling in the direction described by Mr. Mott. I of course lay the stress on the direction of the meteor and not the distances of the observers from London.

A. TREVOR CRISPIN

Lansdowne Road, Wimbledon, S.W., August 27

IT may be of interest to some of your readers to know that the meteor mentioned in *NATURE* as seen on Sunday evening, August 19, was also seen here, timed by me at 10.1 p.m. The compass bearings were from south-east past east to east-east-north, about 35° from horizon; colour, yellow orange; first seen coming from behind a cloud; divided due east, one part falling considerably.

W. M. POOLEY

Bath Road, Cheltenham, August 26

Stachys palustris as Food

I SHOULD be much obliged if any of your readers could give me any information as to whether the rhizomes of *Stachys palustris*, L., are used by the country people either in Great Britain or elsewhere for food. I believe the English name of the plant is Base Horehound, and that in the last century it was so used.

A. WENTZ'L

Krásnicza Wola, Grodzisk, near Warsaw, August 18